CLAIMS

What is claimed is:

1.   An apparatus determining an optimum recording power suitable for a disc loaded in a disc drive, comprising:

a pickup unit recording data on the disc and reproducing the recorded data from the disc; and

a control unit controlling the disc drive to record data in a predetermined area of the disc using a preset reference recording power, detecting a plurality of recording powers using reproduction signals of the predetermined area reproduced from the pickup unit and at least one reference value, and determining the optimum recording power for the disc based on the detected plurality of recording powers.

2.   The apparatus of claim 1, wherein when the data is recorded in the predetermined area of the disc, the control unit varies the reference recording power.

3.   The apparatus of claim 1, wherein the control unit determines the recording powers used when the data is recorded in the predetermined area based on the reference recording power, a predetermined variable range of the reference recording power, and a coefficient (ε) recorded in a recording information supplying area of the disc.

4.   The apparatus of claim 1, wherein the one or more reference values are set in consideration of one of a modulation rate and asymmetry between the reproduction signals from the pickup unit.

5.   The apparatus of claim 1, wherein the one or more reference values is a plurality of values set by considering a modulation rate and an asymmetry between the reproduction signals of the predetermined area reproduced from the pickup unit.

6.   The apparatus of claim 1, wherein in a case where the reference value is set in consideration of a modulation rate between the reproduction signals of the predetermined area reproduced from the pickup unit, the control unit detects a reproduction signal having a modulation rate closest to the reference value, and detects a recording power used when the detected reproduction signal is recorded as one of the plurality of recording powers.

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7.   The apparatus of claim 6, wherein the modulation rate is a modulation rate between amplitudes of reproduction signals of a minimum mark and a maximum mark recorded in the predetermined area among the reproduction signals from the pickup unit.

8.   The apparatus of claim 6, wherein the reference value corresponding to the modulation rate is variably set depending on the kind of the disc.

9.   The apparatus of claim 1, wherein in a case where the reference value is set in consideration of an asymmetry between the reproduction signals of the predetermined area reproduced from the pickup unit, the control unit detects a reproduction signal having the asymmetry closest to the reference values, and detects a recording power used when the detected reproduction signal is recorded as one of the plurality of recording powers.

10.   The apparatus of claim 9, wherein the asymmetry is used to detect whether the reproduction signals of a minimum mark and a maximum mark recorded in the predetermined area among the reproduction signals from the pickup unit are asymmetric with respect to each other.

11.   The apparatus of claim 1, wherein the control unit calculates an average value of the detected plurality of recording powers used as an optimum recording power.

12.   The apparatus of claim 1, further comprising a tilt compensation unit which is controlled by the control unit and drives the pickup unit to compensate a tilt with respect to the predetermined area of the disc.

13.   The apparatus of claim 12, wherein the control unit detects a compensation amount for the tilt in which an amount of jitter is at a minimum based on the reproduction signal outputted from the pickup unit when the control unit controls the tilt compensation unit while the amount of compensation for the tilt based on an amount of the tilt detected in the pickup unit varies within a predetermined angle range, and determines the detected compensation amount for the tilt as an optimum compensation amount for the tilt.

14.   The apparatus of claim 1, further comprising a decoder decoding a signal outputted from the pickup unit and outputs signals,

wherein the control unit checks if a predetermined signal among the signals outputted from the decoder satisfies the reference value, and detects a recording power used when the predetermined signal is recorded as one of the plurality of recording powers.

15.   The apparatus of claim 14, wherein in a case where the reference value is set in consideration of a block error rate, the control unit detects information of block error rates of the signals outputted from the decoder, detects a block where the block error rate is at a minimum, and detects a recording power used when data is recorded on the detected block as one of the plurality of recording powers.

16.   The apparatus of claim 1, wherein random data is recorded in the predetermined area.

17.   The apparatus of claim 1, wherein the predetermined area is included in a lead-in area of the disc.

18.   The apparatus of claim 1, wherein the predetermined area is an area adjacent to the lead-in area of the disc.

19.   A method for determining an optimum recording power suitable for a disc loaded in a disc drive, comprising:

recording data in a predetermined area of the disc using a preset reference recording power that varies;

detecting a plurality of reproduction signals among signals reproduced from the predetermined area on the disc based on one or more reference values ;

detecting a plurality of recording powers corresponding to the detected plurality of reproduction signals; and

determining an optimum recording power for the disc using the detected plurality of recording powers.

20.   The method of claim 19, wherein the recording of data comprises recording the data while the reference recording power varies.

21.   The method of claim 19, wherein the recording of data comprises recording the data having recording powers determined based on the reference recording power, a predetermined variable range of the reference recording power, and a coefficient recorded in a recording information supplying area of the disc.

22.   The method of claim 19, wherein one or more reference values are set in consideration of any one of a modulation rate and an asymmetry between the plurality of reproduction signals.

23.   The method of claim 19, wherein one or more reference values is a plurality of values determined by considering the modulation rate and the asymmetry between the plurality of reproduction signals.

24.   The method of claim 19, wherein in a case where one or more reference values are set in consideration of the modulation rate of the plurality of reproduction signals, the detecting of the plurality of recording powers comprises:
         detecting one of the plurality of reproduction signals having a modulation rate closest to the reference values, and
         detecting a recording power used when the detected reproduction signal is recorded as one of the plurality of recording powers.

25.   The method of claim 19, wherein in a case where one or more reference values are set in consideration of the asymmetry between the plurality of reproduction signals, the detecting of the plurality of recording powers comprises:
         detecting one of the plurality of reproduction signals having an asymmetry closest to the reference values, and
         detecting a recording power used when the detected reproduction signal is recorded as one of the plurality of recording powers.

26.   The method of claim 19, wherein the determining of the optimum recording power comprises determining an average value of the detected plurality of recording powers as the optimum recording power.

27.   The method of claim 19, further comprising compensating a tilt with respect to the predetermined area on the disc before detecting the plurality of recording powers.

28.   The method of claim 19, wherein in a case where one or more reference values are set in consideration of a block error rate, the detecting of the plurality of recording powers comprises:

detecting information of block error rates of signals decoding the reproducing signals of the predetermined area,

detecting a block having block error rate information satisfying the reference values among the detected information of the block error rates, and

detecting a recording power used when data is recorded on the detected block as one of the plurality of recording powers.

29.   The method of claim 19, wherein random data is recorded in the predetermined area.

30.   An apparatus determining a corrected optimum recording power suitable for a disc loaded in a disc drive, comprising:

a pickup unit outputting a signal from the disc;

a decoder decoding the outputted signal from the pickup unit;

at least one of a block error rate measuring unit measuring block error rate information of data recorded in a predetermined area of the disc and outputting a measured block error rate information, a modulation rate measuring unit measuring a modulation rate of the outputted signal from the pickup unit and outputting a measured modulation rate, and an asymmetry measuring unit measuring an asymmetry of the outputted signal from the pickup unit and outputting a measured asymmetry measurement; and

a control unit calculating a corrected optimum recording power based on at least one of the block error rate information measurement, the modulation rate measurement, and the asymmetry measurement.

31.   The apparatus according to claim 30, further comprising:

an encoder encoding an inputted recording signal; and

a recording pulse generator generating a recording pulse on the disc based on the corrected optimum recording power.

32.   The apparatus according to claim 30, wherein a first recording power is associated with a minimum block error rate information measurement, a second recording power is associated with a modulation rate measurement between a minimum recording mark and a maximum recording mark closest to a preset reference value, and a third recording power is associated with a minimum asymmetry measurement.

33.   The apparatus according to claim 32, wherein the corrected optimum recording power is an average of the first, second, and third recording powers.

34.   A method determining a corrected optimum recording power suitable for a disc loaded in a disc drive, comprising:

outputting a signal from the disc;

decoding and amplifying the signal;

measuring and outputting measurements of at least one of block error rate information of data recorded in a predetermined area of the disc, a modulation rate of the signal, and an asymmetry of the signal; and

calculating a corrected optimum recording power based on the measurements.

35.   The method according to claim 34, further comprising:

encoding an inputted recording signal; and

generating a recording pulse on the disc based on the corrected optimum recording power.

36.   The method according to claim 34, wherein the measurements are least one of a first recording power associated with a minimum value of block error rate information, a second recording power associated with a modulation rate of the signal between a minimum recording mark and a maximum recording mark closest to a preset reference value, and a third recording power associated with a minimum asymmetry.

37.   The method according to claim 36, wherein the corrected optimum recording power is averaging the first, second and third recording powers.

38. An apparatus determining a corrected optimum recording power suitable for a disc loaded in a disc drive, comprising:

a pickup unit recording data on the disc and reproducing the recorded data from the disc; and

a control unit determining a corrected optimum recording power for the disc based on a reference recording power, a predetermined variable range of the reference recording power, and a coefficient (ε) recorded in a recording information supplying area of the disc,

wherein the reference recording power is based upon a modulation rate closest to a reference value between a plurality of reproduction signals from the pickup unit, a symmetry closest to a reference value between the plurality of reproduction signals from the pickup unit, and a minimum value of information on a block error rate.

39. The apparatus of claim 38, further comprising a tilt compensation unit controlled by the control unit and driving the pickup unit to compensate a tilt with respect to the predetermined area of the disc, wherein the compensation amount for the tilt is based on an amount where a jitter is a minimum.

40. A computer readable medium encoded with processing instructions implementing a method for deciding an optimum recording power suitable for a disc loaded in a disc drive, the method comprising:

recording data in a predetermined area of the disc using a varying preset reference recording power;

detecting a plurality of reproduction signals among signals reproduced from the predetermined area on the disc based on one or more reference values;

detecting a plurality of recording powers corresponding to the detected plurality of reproduction signals; and

deciding an optimum recording power for the disc using the detected plurality of recording powers.

41. The computer readable medium according to claim 40, wherein the data has recording powers decided based on the reference recording power, a predetermined variable range of the reference recording power, and a coefficient recorded in a recording information supplying area of the disc.

42.   The computer readable medium according to claim 40, wherein one or more reference values are set in consideration of a modulation rate closest to a reference value between a plurality of reproduction signals from the pickup unit, a symmetry between the plurality of reproduction signals from the pickup unit, and information on a block error rate.

43.   The computer readable medium according to claim 40, further comprising compensating a tilt with respect to the predetermined area on the disc before detecting the plurality of recording powers.

44.   The computer readable medium according to claim 40, wherein in a case where one or more reference values are set in consideration of a block error rate, the detection of the plurality of recording powers comprises:

detecting block error rate information of signals decoding the reproducing signals of the predetermined area,

detecting a block having block error rate information satisfying the reference values among the detected block error rate information, and

detecting a recording power used when data is recorded on the detected block as one of the plurality of recording powers.

45.   A method of determining an optimum recording power suitable for a disc loaded in a disc drive, comprising:

presetting a reference recording power in the disc drive;

recording a coefficient (ε) in a recording information supplying area of the disc;

recording data in a predetermined area of the disc, wherein the reference recording power varies within a predetermined variable range as the data is recorded; and

detecting a recording power corresponding to a position where the data is recorded; and

determining the optimum recording power based on the value of the detected recording power.

46.   The method according to claim 45, wherein the data recorded is random data.

47. The method according to claim 45, wherein the detecting of recording power is based on at least one of a measurement result of modulation rate of signals from the disc, a measurement result of information of the block error rate of data recorded on the disc, and a measurement result of an asymmetry of signals from the disc.

48. A method of preventing an unwanted varying of a recording power used by an active layer of a disc due to a hardware error in a disc drive, comprising:

recording data in a predetermined area of the disc while varying a recording power based on a reference recording power preset in the disc drive;

detecting a plurality of recording powers by comparing predetermined reference values with an amplitude of at least one of a RF signal picked up from the disc and a signal outputted from a decoder; and

determining an optimum recording power using the detected plurality of recording powers.

49. The method according to claim 48, wherein the detecting of the plurality of recording powers is based on a measurement result of modulation rate of signals from the disc, a measurement result of information of the block error rate of data recorded on the disc, and a measurement result of an asymmetry of signals from the disc.